

MANAGEMENT OF BLAST (*Pyricularia grisea*) OF PADDY THROUGH BOTANICALS AND ORGANIC PRODUCTS

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ABSTRACT

Rice (*Oryza sativa* L.) is the second most important cereal crop grown in India. It is a staple food in several major parts of the country. Blast is one of the most important diseases on rice caused by *Pyricularia grisea*. The pathogen known to attack paddy crop on various stages viz., seedling, tillering and panicle emergence stages due to severe infection the leaves becomes dried and appear to burnt appearance in nursery and also in main field, resulting reduction in the yield of paddy. The experiment on effect of Neem based products with combination of fungicides were tried under field conditions to know the efficacy of this product on rice blast incidence during 2009-10 and 2010-11. The product was sprayed during tillering and panicle emergence stages. Neem azal sprayed field infested with 19.06 per cent neck blast and produced yield up to 2716.5kg/ha. The first spray of Neem azal given during tillering stage and second spray with fungicides viz., Hinosan, Bavistin, Beam, Protega and Neem azal were sprayed during panicle emergence stage. Neem azal followed by protega recorded least neck blast incidence i.e., 15.35 per cent with highest yield of 3059.50kg/ha. In without spray field recorded highest neck blast incidence (66.32%) with lowest seed yield (885kg/ha). In another experiment organic products viz., Cow urine, panchagavya, leaf extract of Eupatorium, Jatropa, Neem were tried against blast disease. All these products have little effect to reduce the neck blast incidence with slight increase in seed yield. The leaf extracts were used alone or in combination with some recommended fungicides. The extracts showed high antifungal activity in Neem azal followed by beam or protega fungicide sprayed field. The Neem azal followed by protega reduced neck blast incidence with increase in yield. Cow urine, panchagavya, leaf extract of Eupatorium, Jatropa, Neem reduced neck blast incidence some extent with slight increase in seed yield.

KEYWORDS: Seedling, Tillering and Panicle Emergence Stages

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INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most important cereal crops and it belongs to the family Poaceae. It is the staple food crop for 70 per cent of the world's population. Rice occupied a total area up to 37 per cent under food grains production in the world's and it stands First place and next cereal crop is wheat. Rice crop is affected by many diseases caused by fungi, bacteria, viruses, phytoplasma, nematodes and other non-parasitic disorders. Among the fungal diseases, blast (*Pyricularia grisea* (Cook) Sac.) brown leaf spot [*Exerohilum oryzae* (Van Breda de Haan.) Subram. And Jain] and sheath blight of rice (*Rhizoctonia solani* Kuhn) are the more prevalent and destructive ones.

Blast is caused by *Pyricularia grisea* Sac. is the most important fungal disease. This occurs in all rice growing regions. The pathogen known to attack paddy crop on various stages viz., seedling, tillering and panicle emergence stages and pathogen infecting various plant parts viz., leaf, sheath, stem, neck, panicles and grain discolourations and due to severe infection of the pathogen the leaves becomes dried and appear to burnt

appearance in nursery and also in main field. The pathogen also infect neck and panicles during maturity stage of the crop resulting chaffyness of the panicles and discoloration of grain resulting reduction in the yield of paddy.(Goto, 1965). Blast disease has long been known on rice. Blast is generally considered as the major disease of rice; because of its wide spread distribution and its destructiveness under favourable conditions. The present investigation was attempted to manage blast pathogen *Pyricularia grisea* under field conditions by using botanicals and organic products.

Krishna Mohan *et al.* (1988) stated that leaf extract of onion; garlic and neem were effective in reducing mycelial growth of *Pyricularia oryzae*. Mariyappan *et al.*, 1995 reported effect of leaf extract of 21 plant species in vitro studies reveals the leaf extract of *Prosopis juliflora*, *Adhatoda vasica*, *Vitex regundo* and *Azadiracta indica* at 10 per cent concentration inhibited the growth of mycelia of *P. grisea* to an extent of 93, 93.3, 87.4, 72.4 and 66.5 per cent respectively over control. Similarly, in another studies 20 plant species were tested and among these *Prosopis juliflora*, *Zizyphus jujube*, *Abutilon indicum*, *Cyanodon dactylon*, *Cyperus rotundus*, *Clerodendron inerme*, *Lantana camara*, *Bourhaevia diffusa* and *Azadiracta indica* inhibited the growth of *P. oryzae* from 93.3per cent to 66.8per cent over control (Mariyappan *et al.*, 1995).

MATERIAL AND METHODS

The efficacies of neem products *viz.*, neemazal in combination with commercially available fungicides were tested against leaf and neck blast in upland rainfed rice at Coorg district. The treatments were *viz.*, Neem azal followed by Hinosan (T₁), Neemazal followed by Bavistin (T₂), Neemazal followed by Beam (T₃), Neemazal followed by Protega (T₄), Neemazal followed by Neemazal (T₅) and Hinosan followed by Hinosan (T₆), Bavistin followed by Bavistin (T₇), Beam followed by Beam (T₈), Protega followed by Protega (T₉) and untreated control (T₁₀).

Experiment on the effect of various organic products *viz.*, cow urine, panchagavya (Cow urine, Cow dung, Cow milk, Ghee, Curds: Subhashini *et al.*, 2001) and other leaf extracts of Eupatorium, Jatropa and Neem with commercial Neem based products *viz.*, Nimbicidine, Achook and Neem azal were sprayed with different dosage during tillering and panicle emergences stages for over a period of two years. The observations on leaf and neck blast along with seed yield were recorded.

RESULTS AND DISCUSSIONS

The efficacy of neem products namely neem azal in combination with commercially available fungicides against leaf and neck blast and seed yield of upland rainfed rice in Coorg district was under taken during *Kharif* 2004-05 & 2005-06. The minimum leaf blast (3.5 %) and neck blast (10.97 %) were observed in Protega followed by protega sprayed field with seed yield of 4169 kg/ha. The leaf blast incidence was followed by Beam followed by Beam (4.88 %), Neemazal followed by Protega (5.83 %) and Neemazal followed by Beam (11.66 %). The neck blast incidence followed by Neemazal followed by Protega (15.35%), Bavistin followed by Bavistin (24.64%) and followed by Neemazal followed by Beam (19.59 %). The maximum yield was observed in Protega followed by protega (4169 kg/ha) followed Beam followed by Beam (3644 kg/ha) and Bavistin followed by Bavistin (3176 kg/ha). The minimum seed yield was observed in untreated control (905 kg/ha) followed by Neemazal followed by Neemazal sprayed field (Table 1)

Among plant product tested against blast disease management in field conditions for two years. The Panchagaya and Neem leaf extract recorded 11.32 and 11.68 per cent leaf blast and 24.23 and 24.96 per cent of neck blast incidence. The commercial available neem based products Neem azal recorded lowest leaf (6.66 %) and neck blast (19.06 %)

incidence. The highest yield recorded in these treatment *i.e.*, 2716.5, 2571.0 2343.5, 2189.5 kg/ha.in Neem azal, Achook, Panchagavya and Neem leaf extract sprayed field compared to control field. In control field the lowest yield was recorded 895.5 kg/ha with highest incidence of leaf and neck blast was 31.71 per cent and 55.21 per cent respectively (Table 2).

The Neem bio-pesticides were sprayed during tillering and panicle emergence stages. Neem azal sprayed field recorded with 19.06 per cent neck blast and yield was 2716.5kg/ha. The first spray of Neem azal given during tillering stage and second spray with fungicides *viz.*, Hinosan, Bavistin, Beam, Protega and Neem azal were sprayed during panicle emergence stage. Neem azal followed by protega recorded least neck blast incidence *i.e.*, 15.35 per cent with highest yield of 3059.50 kg/ha. Protega followed by protega or Beam followed Beam recorded least incidence of neck blast *i.e.*, 12.01 and 17.23 per cent with highest yield 4169 and 3644 kg/ha respectively. In without sprayed field recorded highest neck blast incidence (66.32 %) with lowest seed yield (885 kg/ha). Peterson (1990) reported the fungicide Tricyclazole interferes with appressorial function by inhibiting melanin biosynthesis and host penetration. Protega followed by Protega or Beam followed Beam recorded least incidence of neck blast *i.e.*, 12.01 and 17.23 per cent with highest yield 4169 and 3644 kg/ha respectively. Protega (Carpropamid) inhibiting melanin biosynthesis and also potentiates the activation of defense responses during fungal invasion was reported by Thieron *et al.* (1999). In field without spray recorded highest neck blast incidence (66.32 %) with lowest seed yield (885 kg/ha).

In another experiment organic products *viz.*, Cow urine, panchagavya, leaf extract of Eupatorium, Jatropa, Neem were tried against blast disease. All these products have little effect to reduce the neck blast incidence with slight increase in seed yield. In Neem azal sprayed field observed 19.06 per cent neck blast with seed yield of 2716.5 kg/ha. In unsprayed field neck blast incidence was 55.21 per cent with yield of 895.5 kg/ha. The leaf extracts were used alone or in combination with Protega and Tricyclazole fungicides. The extracts showed high antifungal activity in Neem azal followed by beam or protega fungicides sprayed field. Salem *et al.* (2004) also observed beam with Christmas berry or khella was effective for leaf and panicle blast infection control. The Neem based formulations *viz.*, Nimbicidine and Neem gold were effective in reducing the disease incidence and in gaining higher yield was reported by Hossain and Kulkarni (2001).

In Neem azal sprayed field observed 19.06 per cent neck blast with seed yield of 2716.5 kg/ha. Neem azal followed by protega recorded least neck blast incidence *i.e.*, 15.35 per cent with highest yield of 3059.50 kg/ha. In unsprayed field neck blast incidence was 55.21 per cent with yield of 895.5 kg/ha. The leaf extracts were used alone or in combination with some recommended fungicides. The extracts showed high antifungal activity in Neem azal followed by beam or protega fungicide sprayed field.

CONCLUSIONS

The Neem azal followed by protega fungicide spray reduced neck blast incidence with increase in yield. Cow urine, panchagavya, leaf extract of Eupatorium, Jatropa, Neem reduced neck blast incidence some extent with slight increase in seed yield.

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APPENDIX

Table1: Efficacy of Neemazal in Combination with Fungicides against Leaf and Neck Blast and Their Effect on Paddy Yield

Sl. No.	Treatments	Per cent Leaf blast			Per cent Neck blast			Yield Kg/ha		
		2009-10	2010-11	Mean	2009-10	2010-11	Mean	2009-10	2010-11	Mean
1	Neemazal * followed by Himosan **	15.00	14.00	14.50	23.54	30.42	26.98	1868	2649	2258.5
2	Neemazal followed by Bavistin	16.66	15.24	15.95	19.67	36.32	27.99	2577	2758	2667.5
3	Neemazal followed by Beam	13.33	10.00	11.66	17.36	21.82	19.59	2762	2833	2797.5
4	Neemazal followed by Protega	6.66	5.00	5.83	13.65	17.06	15.35	2939	3180	3059.5
5	Neemazal followed by Neemazal	12.00	13.33	12.66	18.55	28.38	23.46	2596	2506	2551.0
6	Himosan followed by Himosan	16.79	15.00	15.89	25.25	25.85	25.55	2743	2716	2729.6
7	Bavistin followed by Bavistin	11.66	13.27	12.46	17.19	32.10	24.64	3372	2980	3176.0
8	Beam followed by Beam	5.00	4.77	4.88	13.77	17.23	15.50	4155	3133	3644.0
9	Protega followed by Protega	5.00	2.00	3.50	9.94	12.01	10.97	4228	4110	4169
10	Control	28.33	26.68	27.50	46.19	66.32	56.25	737	1033	885.0
Mean		13.05	11.92	12.48	20.51	28.75	24.63	2797.5	2789.8	2793.75
CD @ 5%		4.87	6.02	-----	5.39	5.30	-----	447.15	373.48	-----
CV%		22.07	28.37	----	15.32	10.76	-----	9.31	7.05	-----
S.E.m±		1.64	2.02	-----	1.81	1.78	-----	150.49	113.58	-----

Note: Dosages Neemazal=3ml/lit; Beam=0.6gms/lit; Bavistin, Hinasan and Protega 1ml/lit

*First spray 30days at tillering stage ** Second spray 60at 5% panicle emergence stage

Table 2: Effect of Organic and Neem based Compounds against Neck Blast

Sl. No.	Treatments	Dosage ml/L	Per cent Leaf Blast			Per cent Neck Blast			Yield Kg/ha		
			2009-10	2010-11	Mean	2009-11	2010-11	Mean	2009-10	2010-11	Mean
1	Cow urine	10	26.66	20.00	23.33	31.99	33.56	32.77	2244	2183	2213.5
2	Panchagaya	10	15.00	7.65	11.32	22.86	25.61	24.23	2342	2345	2343.5
3	Eupatorium leaf extract	10	21.66	16.66	19.16	31.49	39.21	35.35	1783	2310	2046.5
4	Jatropa leaf extract	10	25.00	20.00	22.50	25.67	45.54	35.60	1594	1748	1671.0
5	Neem leaf extract	10	16.65	6.67	11.68	21.99	27.94	24.96	1933	2446	2189.5
6	Nimbidine	5	26.60	5.00	15.80	28.06	26.11	27.08	1693	2700	2196.5
7	Achook	5	13.30	2.00	7.66	20.43	23.56	21.99	2466	2676	2571.0
8	Neem azal	3	11.66	1.67	6.66	17.88	20.24	19.06	2595	2838	2716.5
9	Hinosan	1	15.00	5.00	10.00	25.25	23.88	24.56	2543	2880	2711.5
10	Control		36.76	26.66	31.71	49.81	60.62	55.21	748	1043	895.5
Mean			20.89	11.13	15.98	27.54	32.62	30.08	1994.1	2313.77	2153.99
CD @ 5%			5.55	3.00	----	9.86	6.91	-----	608.10	434.25	-----
CV %			14.94	15.09	-----	20.31	11.95	-----	17.96	10.84	-----
S.Em±			1.85	1.00	-----	3.29	2.30	-----	202.82	144.84	-----

